

Utah Department of Transportation

Minimum Sampling and Testing Requirements

Revised May 2007

TABLE OF CONTENTS

Introduction

Part One:

02056.....	Embankment, Borrow and Backfill
02712.....	Lean Concrete Base Course
02721.....	Untreated Base Course (UTBC)
02741.....	Hot Mix Asphalt (HMA)
02745.....	Asphalt Materials
02752	Portland Cement Concrete Pavement
02765.....	Pavement Marking Paint
02785	Chip Seal Coat
02786	Open Graded Seal Coat
03055	Portland Cement Concrete

UTAH DEPARTMENT OF TRANSPORTATION

MINIMUM SAMPLING AND TESTING REQUIREMENTS

1. PURPOSE

This document provides general guidance to personnel responsible for verification sampling and testing consistent with the Code of Federal Regulations 23 CFR 637B, which requires each State Transportation Department to establish frequency guide schedules for verification sampling and testing.

2. SCOPE

This document consists of two parts. The first outlines the testing and documentation required for materials that are manipulated and processed at or near the project site and tested for acceptance as close as practical to final incorporation in the work under the direction of the Resident Engineer. The second summarizes the testing and documentation required for materials obtained from qualified sources as determined through the Department's Quality Management Plans and for manufactured products where industry quality control procedures demonstrate consistent satisfaction of the specifications.

3. REFERENCES

- a. UDOT Materials Manual of Instruction
- b. UDOT Standard Specifications
- c. UDOT Quality Management Plans
- d. AASHTO Standard Specifications for Transportation Materials
- e. UDOT Policy and Procedure 08B-31 – Project Materials Certification

4. GENERAL PROCEDURES

The Resident Engineer is responsible for obtaining all substantiating documentation used to justify acceptance of the Contractor's work and provide documentary evidence of specification compliance to support acceptance and payment to the Contractor for materials furnished and work completed. The Resident Engineer verifies supporting documentation prior to partial and final payment. In the case of failure to meet the material quality requirements, the documentation will constitute the basis for rejection or work deemed unfit for acceptance, or it may be the basis for its acceptance upon appropriate contract price adjustment where this is permitted under the contract provisions. (Reference UDOT Standard Specification Sections 00727 and 01455.) Complete records including test and inspection reports covering acceptance or rejection are to be maintained in the project files.

The Resident Engineer certifies the materials incorporated into the project are in conformance with the approved plans and specifications in accordance with UDOT Policy and Procedure 08B-31.

Materials Processed at or Near the Project Site

Acceptance sampling and testing is performed in accordance with Part 1 of this document under the direction of the Resident Engineer by UDOT TTQP qualified personnel. Samples are taken at the point of acceptance and compliance tests are performed to determine if the material is acceptable under the applicable section of the specifications.

Manufactured Products

Part 2 of this document identifies manufactured materials that are incorporated in the work through either manufacturer's Certificate of Compliance as described under UDOT Standard Specification 01455 – Materials Quality Requirements, or by the Resident Engineer's verification of manufacturer's product data and/or specifications, furnished by the Contractor, meeting the requirements cited under the applicable UDOT specification.

Qualified Sources

Part 2 of this document identifies certain materials found to be acceptable from qualified sources through the Department's Quality Management Plans. These materials include: Portland cement, flyash and pozzolans, reinforcing steel and coatings, precast prestressed concrete, hydrated lime, and asphalt binder and emulsions.

Samples of any material may be taken at any time. Any material found to be out of specification shall be rejected and removed from the project site at the contractor's expense or be subject to applicable price adjustments. Items not identified in the Minimum Sampling and Testing Requirements require appropriate testing or verification as outlined in supplemental specifications and/or approved special provisions.

UDOT Minimum Sampling and Testing Requirements

Revised April '07

Specification - Material: 02056 Embankment, Borrow and Backfill

02056 Embankment, Embankment for Bridge, and Backfill Placements

Assurance: Soil Classification

Reference: AASHTO M 145

Lot Size: Source / soil type or each 20,000 cubic yards or 30,000 tons thereafter.

Frequency per Lot: One per lot

Point of Acceptance: Grade after processing prior to compaction

Sampling Reference: AASHTO T 2

Report/Form: Weekly Form 348

02056 Free Draining Granular Backfill

Assurance: Sieve analysis (gradation)

Reference: AASHTO T 27 / T 11.

Lot Size: Daily Placement

Frequency per Lot: One per 500 tons or 350 cubic yards

Point of Acceptance: Grade after processing, prior to compaction

Sampling Reference: AASHTO T 2

Report/Form: Weekly Form 348

02056 Embankment, Embankment for Bridge, and Backfill Placements

Assurance: Laboratory Maximum Dry Density and Optimum Moisture for Density Standard

Reference: AASHTO T 99 Method D / AASHTO T 180 Method D for A-1 soils.

Lot Size: Source / soil type and each 20,000 cubic yards or 30,000 tons thereafter.

Frequency per Lot: One per 20,000 cubic yards or 30,000 tons for each layer.

Point of Acceptance: Grade after processing, prior to compaction

Sampling Reference: AASHTO T 2

Report/Form: Weekly Form 348

<i>Specification - Material: 02056 Embankment, Borrow and Backfill</i>

02056 Embankment and Subgrade Placements

Assurance: In-place density

Reference: AASHTO T 310

Lot Size: A lot equals material placed to line and grade and compacted in one production day

Frequency per Lot: A lot is divided into equal sublots not to exceed 5000 square yards per lift, 15,000 square yards in cut sections. A minimum of one randomly located determination per sublot

Point of Acceptance: Grade after Compaction

Sampling Reference: MOI 8-984

Report/Form: Weekly Form 348

02056 Embankment for Bridge

Assurance: In-place density

Reference: AASHTO T 310

Lot Size: One foot lift

Frequency per Lot: Six randomly located determinations per one foot lift. Two of the six determinations must be within two feet of the outside perimeter.

Point of Acceptance: Grade after Compaction

Sampling Reference: MOI 8-981 / MOI 8-984

Report/Form: Weekly Form 348

02056 Backfill Placements

Assurance: In-place density

Reference: AASHTO T 310

Lot Size: A lot equals 1000 square yards or less and not more than one pipe culvert or small structure.

Frequency per Lot: Four randomly located determinations per lot, minimum one determination per lift. Placements less than 10 cubic yards or 15 tons, test as directed by the engineer.

Point of Acceptance: Grade after Compaction

Sampling Reference: MOI 8-984

Report/Form: Weekly Form 348

Specification - Material: 02056 Embankment, Borrow and Backfill

Assurance: Compaction - Material that is too rocky to apply the correction for coarse particles: 30% cumulatively retained on the ¾" sieve

Reference: AASHTO T 224

Lot Size:

Frequency per Lot: Compaction is visually inspected. Document method and equipment used for placement, appearance of gradation uniformity, moisture content, compactive effort, and final appearance.

Point of Acceptance: Grade

Sampling Reference:

Report/Form: Weekly Form 348

Assurance: Visual Acceptance of very small quantities of materials

Reference: Acceptance is limited to material being furnished from sources found satisfactory under normal sampling and testing procedures.

Lot Size: Not to exceed 200 cubic yards or 300 tons per day or 1000 cubic yards or 1500 tons per project

Frequency per Lot: One report for each day material is accepted

Point of Acceptance: Grade

Sampling Reference:

Report/Form: Visual Inspection Report

UDOT Minimum Sampling and Testing Requirements

Revised April '07

Specification - Material: 02712 Lean Concrete Base Course

Assurance: Sieve Analysis

Reference: AASHTO T 27 / T 11

Lot Size: Paving Day

Frequency per Lot: One per stockpile

Point of Acceptance: Project stockpile

Sampling Reference: AASHTO T 2

Report/Form:

Assurance: Thickness

Reference: Thickness, determined by three measurements on each core (using a tape measure), recorded to 1/8 in. and averaged.

Lot Size: Project

Frequency per Lot: One core per 12000 sq. ft. Final areas less than 6000 sq. ft. will be added to the previous section. Final section over 6000 sq. ft. will constitute a separate area. Hand placements are considered separately. One core per placement area.

Point of Acceptance: Finished pavement

Sampling Reference: Randomly sampled according to AASHTO T 24

Report/Form:

UDOT Minimum Sampling and Testing Requirements

Revised April '07

Specification - Material: 02721 UTBC

02721 UTBC Type I Placement

Assurance: Sieve Analysis

Reference: AASHTO T 27 / T 11

Lot Size: Quantity processed, placed to line and grade in one day.

Frequency per Lot: One per subplot of 500 cubic yards or 900 tons

Point of Acceptance: Grade after processing prior to compaction

Sampling Reference: AASHTO T 2

Report/Form: Daily Form 138

02721 UTBC Type I Placement

Assurance: Maximum Dry Density and Optimum Moisture Determination for Density Standard

Reference: AASHTO T 180 Method D

Lot Size: 10,000 cubic yards or 18,000 tons

Frequency per Lot: One to be used as a density standard for in-place density determination

Point of Acceptance: Grade after processing, prior to compaction

Sampling Reference: AASHTO T 2

Report/Form: Daily Form 138

02721 UTBC Type I Placement

Assurance: In-place density

Reference: AASHTO T 310

Lot Size: Quantity processed, placed to line and grade in one day.

Frequency per Lot: One per subplot of 2500 square yards

Point of Acceptance: Grade after compaction

Sampling Reference: MOI 8-984

Report/Form: Form 138

<i>Specification - Material: 02721 UTBC</i>
--

02721 UTBC Type I Placement

Assurance: Moisture Content

Reference: AASHTO T 255

Lot Size: Quantity processed, placed to line and grade in one day.

Frequency per Lot: One per subplot of 2500 cubic yards or 4500 tons

Point of Acceptance: Grade after processing prior to compaction

Sampling Reference: AASHTO T 2

Report/Form: Form 138

02721 UTBC Type II Placement

Assurance: Sieve Analysis and Moisture Content

Reference: AASHTO T 27 / T 11, AASHTO T 255

Lot Size: Quantity processed, placed to line and grade in one day.

Frequency per Lot: One per lot: Curb and Gutter – 10,000 feet; Sidewalk – 3000 square yards; Driveway, Pedestrian Access Ramp, Waterway, Flatwork, and other items not listed above – 25,000 square feet

Point of Acceptance: Grade after processing prior to compaction

Sampling Reference: AASHTO T 2

Report/Form: Daily Form 138

02721 UTBC Type II Placement

Assurance: Maximum Dry Density and Optimum Moisture Determination

Reference: AASHTO T 180

Lot Size: 10,000 cubic yards or 18,000 tons

Frequency per Lot: One to be used as a density standard for in-place density determination

Point of Acceptance: Grade after processing prior to compaction

Sampling Reference: AASHTO T 2

Report/Form: Daily Form 138

Specification - Material: 02721 UTBC

02721 UTBC Type II Placement

Assurance: In-place density

Reference: AASHTO T 310

Lot Size: Quantity processed, placed to line and grade in one day.

Frequency per Lot: One per subplot: Curb and Gutter – 10,000 feet; Sidewalk – 3000 square yards; Driveway, Pedestrian Access Ramp, Waterway, Flatwork, and other items not listed above – 25,000 square feet

Point of Acceptance: Grade after compaction

Sampling Reference: MOI 8-984

Report/Form: Form 138

02721 UTBC Type III Placement

Assurance: Moisture Content - Contractor provided optimum moisture may be used as the moisture standard

Reference: AASHTO T 255 or AASHTO T 310

Lot Size: Quantity processed, placed to line and grade in one day.

Frequency per Lot: Twice daily during placement

Point of Acceptance: Grade

Sampling Reference: AASHTO T 2, MOI 8-984

Report/Form: Daily Form 138

Assurance: Visual Acceptance of very small quantities of materials

Reference: Acceptance is limited to materials being furnished from sources found satisfactory under normal sampling and testing procedures.

Lot Size: Not to exceed 200 tons per day or 1500 tons per project.

Frequency per Lot: One report for each day material is accepted.

Point of Acceptance: Grade

Sampling Reference:

Report/Form: Visual Inspection Report

UDOT Minimum Sampling and Testing Requirements

Revised April '07

Specification - Material: 02741 HMA

Assurance: Asphalt Binder Content and Sieve Analysis

Reference: AASHTO T 308 and AASHTO T 30

Lot Size: Production Day

Frequency per Lot: Four

Point of Acceptance: Grade behind the paver

Sampling Reference: MOI 8-984

Report/Form:

Assurance: Asphalt Binder Content and Sieve Analysis

Reference: AASHTO T 308 and AASHTO T 30

Lot Size: Production Day

Frequency per Lot: If the fourth sample cannot be obtained the lot is evaluated on three test results

Point of Acceptance: Grade behind the paver

Sampling Reference: MOI 8-984

Report/Form:

Assurance: Theoretical Maximum Specific Gravity (Rice)

Reference: AASHTO T 209

Lot Size: Production Day

Frequency per Lot: Three in conjunction with VMA determination

Point of Acceptance: Grade behind the paver

Sampling Reference: MOI 8-984

Report/Form:

<i>Specification - Material: 02741 HMA</i>
--

Assurance: Voids in Mineral Aggregate (VMA) Determination

Reference: AASHTO T 312, AASHTO R 35

Lot Size: Production Day

Frequency per Lot: Three, in conjunction with Rice Determination (one VMA determination is based on an average of two specimens)

Point of Acceptance: Grade behind the paver

Sampling Reference: MOI 8-984

Report/Form:

Assurance: In-Place Density

Reference: AASHTO T 166

Lot Size: Production Day

Frequency per Lot: Ten: two in each of five equal sublots

Point of Acceptance: Grade after compaction, prior to traffic

Sampling Reference: MOI 8-984

Report/Form:

Assurance: Thickness

Reference: Average of three measurements on each core recorded to 1/8 inch..

Lot Size: Production Day

Frequency per Lot: Ten in conjunction with in-place density determination

Point of Acceptance: Grade after compaction, prior to traffic

Sampling Reference: MOI 8-984

Report/Form:

<i>Specification - Material: 02741 HMA</i>
--

Assurance: Smoothness

Reference: Standard Specification 01452

Lot Size:

Frequency per Lot:

Point of Acceptance:

Sampling Reference:

Report/Form:

Assurance: Visual Acceptance of very small quantities of materials

Reference: Acceptance is limited to materials being furnished from sources found satisfactory under normal sampling and testing procedures

Lot Size: Not to exceed 100 tons per day or 1000 tons per project

Frequency per Lot: One report for each day material is accepted

Point of Acceptance: Grade

Sampling Reference:

Report/Form: Visual Inspection Report

UDOT Minimum Sampling and Testing Requirements

Revised April '07

Specification - Material: 02745 Asphalt Materials

Assurance: Cutback Asphalt

Reference: AASHTO M 81, M 82, ASTM D2026

Lot Size: Each Truck/Trailer

Frequency per Lot: Sample each lot, two 1 quart samples (metal can). Submit one sample per 155 tons to central

Point of Acceptance: Project or Plant

Sampling Reference: AASHTO T 40

Report/Form: Form 509

Assurance: Asphalt Emulsions/Rejuvenating agents, SS, CSS, MS, CMS, CQS, emulsified Primes/Type B, C, D

Reference: Asphalt Emulsion Management Plan (QMP 508)

Lot Size: Only when product is questionable

Frequency per Lot: Check sample, one quart sample (plastic bottle)

Point of Acceptance: Project or Plant

Sampling Reference: AASHTO T 40

Report/Form: Form 509

Assurance: PG Asphalt Binders

Reference: AASHTO M 320, QMP 509

Lot Size: Production Week

Frequency per Lot: Three one-quart samples (metal can) per daily subplot. Submit one per week to Central Binder lab. See QMP 509.10

Point of Acceptance: Injection line at the Hot Plant

Sampling Reference: AASHTO T 40

Report/Form: Form 509

<i>Specification - Material: 02745 Asphalt Materials</i>

Assurance: Visual Acceptance of very small quantities of materials

Reference: Acceptance is limited to only materials being furnished from sources found satisfactory under normal sampling and testing procedures

Lot Size: Not to exceed 10 tons per day or 45 tons per project

Frequency per Lot: One report for each day material is accepted

Point of Acceptance: Grade

Sampling Reference:

Report/Form: Visual Inspection Report

UDOT Minimum Sampling and Testing Requirements

Revised April '07

Specification - Material: 02752 Portland Cement Concrete Pavement

Assurance: Sieve Analysis

Reference: AASHTO T 27 / T 11

Lot Size: Paving Day

Frequency per Lot: One per stockpile

Point of Acceptance: Project Stockpile

Sampling Reference: AASHTO T 2

Report/Form:

Assurance: Slump, Air Content, and Concrete Temperature

Reference: AASHTO T 119, AASHTO T 152, AASHTO T 309

Lot Size: Paving Day

Frequency per Lot: Test until three consecutive batches meet specification at beginning of placement, after shutdowns of 1 hour or more, and after each failed batch, Randomly thereafter for each 800 cubic yards. If first determination fails, immediately retest. If the second test meets specification, immediately retest. Batch is rejected on two failed determinations.

Point of Acceptance: Plant site (Platform) for centrally mixed concrete with non-agitating haul units. Grade for agitating haul units.

Sampling Reference: WAQTC TM 2

Report/Form:

Assurance: Air Content Correlation testing to determine loss of entrained air from the platform to the finished in-place pavement.

Reference: AASHTO T 152

Lot Size: Paving Day

Frequency per Lot: Two tests, one in the morning and one in the afternoon for each day of paving operations. Perform air test at the platform and again from the same load in the finished pavement.

Point of Acceptance: Plant site (Platform) and finished pavement.

Sampling Reference: WAQTC TM 2

Report/Form:

Specification - Material: 02752 Portland Cement Concrete Pavement

Assurance: Density-Yield

Reference: AASHTO T 141

Lot Size: Paving Day

Frequency per Lot: One determination per day in conjunction with an air test.

Point of Acceptance: Plant site (Platform) for centrally mixed concrete with non-agitating haul units. Grade for agitating haul units.

Sampling Reference: WAQTC TM 2

Report/Form:

Assurance: Compressive Strength Test - For concrete centrally mixed with non-agitating haul units.

Reference: Cast in accordance with AASHTO T 23. Tested in accordance with AASHTO T 22. One compressive strength test consists of a set of three cylinders.

Lot Size: Paving Day

Frequency per Lot: One strength test represents 2600 square yards. Hand-placed areas are considered separately.

Point of Acceptance: Plant site (Platform)

Sampling Reference: WAQTC TM 2

Report/Form:

Assurance: Compressive Strength Test - For concrete centrally mixed with agitating haul units or transit mixed.

Reference: Cast in accordance with AASHTO T 23. Tested in accordance with AASHTO T 22. One compressive strength test consists of a set of three cylinders

Lot Size: Paving Day

Frequency per Lot: One strength test represents 700 square yards or one days placement whichever is smaller.

Point of Acceptance: Grade

Sampling Reference: WAQTC TM 2

Report/Form:

<i>Specification - Material: 02752 Portland Cement Concrete Pavement</i>
--

Assurance: Thickness

Reference: Thickness, determined by three measurements on each core, recorded to 1/16 inch and averaged.

Lot Size: Paving Day

Frequency per Lot: One core per 12,000 square ft. Final areas less than 6000 square ft. will be added to the previous section. Final section over 6000 square ft. will constitute a separate area. Hand placements are considered separately. One core per placement area.

Point of Acceptance: Finished pavement

Sampling Reference: Randomly sampled according to AASHTO T 24

Report/Form:

Assurance: Thickness - For placements over existing surfaces

Reference: Graph of the deviations from the profile grade established by the plans or Engineer. Meet requirements listed in 02752

Lot Size: Paving Day

Frequency per Lot: Engineer takes elevations at 100 ft. intervals and compares against the profile and graph.

Point of Acceptance: Finished pavement

Sampling Reference:

Report/Form:

Assurance: Smoothness

Reference: Standard Specification 01452

Lot Size:

Frequency per Lot:

Point of Acceptance:

Sampling Reference:

Report/Form:

UDOT Minimum Sampling and Testing Requirements

Revised April '07

Specification - Material: 02765 Pavement Marking Paint

Assurance: Pavement Marking Paint and Glass Spheres (Bead) Requirements

Reference: Standard Specification 02765

Lot Size: Project

Frequency per Lot: One sample of each color of pavement marking paint and one sample of glass spheres

Point of Acceptance: Project Location

Sampling Reference: MOI 8-932

Report/Form: Central Test Report

Assurance: Visual Acceptance of very small quantities of material

Reference: Acceptance is limited to only material being furnished from sources found satisfactory under normal sampling and testing procedures.

Lot Size: Project

Frequency per Lot: Not to exceed 100 gallons per project.

Point of Acceptance: Project Location

Sampling Reference:

Report/Form: Visual Inspection Report

UDOT Minimum Sampling and Testing Requirements

Revised April '07

Specification - Material: 02785 Chip Seal Coat

Assurance: Sieve Analysis

Reference: AASHTO T 27 / T 11

Lot Size: Stockpile

Frequency per Lot: One gradation per 500 tons of material (estimated) in stockpile

Point of Acceptance: Accept cover material at the source or the project stockpile. Retest at the project stockpile at engineer's discretion

Sampling Reference: AASHTO T 2

Report/Form:

UDOT Minimum Sampling and Testing Requirements

Revised April '07

Specification - Material: 02786 Open Graded Surface Course

Assurance: Asphalt Binder Content and Sieve Analysis

Reference: AASHTO T 308 and AASHTO T 30

Lot Size: Production Day

Frequency per Lot: Four samples per production day is standard, for exceptions see Section 02786 "Acceptance."

Point of Acceptance: Hot Plant

Sampling Reference: MOI 8-984

Report/Form:

Assurance: Thickness

Reference: Verify with a depth probe

Lot Size:

Frequency per Lot:

Point of Acceptance:

Sampling Reference:

Report/Form:

Assurance: Smoothness

Reference: Standard Specification 01452

Lot Size:

Frequency per Lot:

Point of Acceptance:

Sampling Reference:

Report/Form:

<i>Specification - Material:</i> 02786 Open Graded Seal Coat

Assurance: Visual Acceptance of very small quantities of materials

Reference: Acceptance is limited to material being furnished from sources found satisfactory under normal sampling and testing procedures.

Lot Size: Not to exceed 100 tons per day or 1000 tons per project

Frequency per Lot: One report for each day material is accepted

Point of Acceptance: Grade

Sampling Reference:

Report/Form: Visual Inspection Report

UDOT Minimum Sampling and Testing Requirements

Revised April '07

Specification - Material: 03055 Portland Cement Concrete

Assurance: Sieve Analysis

Reference: AASHTO T 27 / T 11

Lot Size: Weekly production

Frequency per Lot: One test per stockpile during any week concrete is being provided to a UDOT project

Point of Acceptance: Supplier Stockpile

Sampling Reference: AASHTO T 2

Report/Form:

Assurance: Slump, Air Content, and Concrete Temperature

Reference: AASHTO T 119, AASHTO T 152, AASHTO T 309

Lot Size: Production Day

Frequency per Lot: Test until two consecutive batches meet specification at beginning of placement, after shutdowns of 1 hour or more, and after each failed batch, Randomly thereafter for each 50 cubic yard minimum. If the first determination fails, immediately retest. If the second test meets specification, immediately retest. Batch is rejected on two failed determinations.

Point of Acceptance: Point of Placement

Sampling Reference: WAQTC TM 2

Report/Form:

Assurance: Compressive Strength Test

Reference: Cast in accordance with AASHTO T 23 Tested in accordance with AASHTO T 22. One compressive strength test consists of a set of three cylinders.

Lot Size: Production Day

Frequency per Lot: One determination for each 50 cubic yards or fraction thereof. For daily quantities less than 8 cubic yards, at Engineer's discretion.

Point of Acceptance: Point of Placement

Sampling Reference: WAQTC TM 2

Report/Form:

<i>Specification - Material: 03055 Portland Cement Concrete</i>

Assurance: Visual Acceptance of very small quantities of material

Reference: Acceptance is limited to materials being furnished from sources found satisfactory under normal sampling and testing procedures.

Lot Size: Not to exceed 4 cubic yards per day or 50 cubic yards per project.

Frequency per Lot: One report for each day material is accepted.

Point of Acceptance: Grade

Sampling Reference:

Report/Form: Visual Inspection Report

Assurance: Visual Acceptance of Class B and B(ae) Concrete

Reference: As directed by Engineer

Lot Size: Daily placement

Frequency per Lot: One report for each day material is accepted

Point of Acceptance: Project

Sampling Reference:

Report/Form: Visual Inspection Report
